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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/809,748	03/15/2001	Chris Heegard	ALA-111	5348
7590		12/29/2004	EXAMINER	
J. Dennis Moore		WANG, TED M		
Texas Instruments		ART UNIT		
Mail Station 3999		PAPER NUMBER		
P.O. Box 655474		2634		
Dallas, TX 75265		DATE MAILED: 12/29/2004		

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/809,748	Applicant(s) HEEGARD ET AL.	
	Examiner Ted M Wang	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 8/12/2004 with respect to the rejection(s) of claim(s) 1 and 3-11 under 35 USC § 102(a), 103(a), and 112 first paragraph have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of US 6,421,399, US 5,233,632, and US 5,170,415.

Response to Amendment

2. The indicated allowability of claims 14-16 are withdrawn in view of the newly discovered reference to US 6,421,399. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Avidor et al. (US 6,421,399).

- With regard claim 1, Avidor et al. discloses a method for estimating carrier

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- frequency and phase offsets comprising: (a) estimating one or more phases of a sequence of digitally modulated symbols (Figs.1 and 4 element $r(t)$, column 4 lines 18-26 and column 4 line 54 – column 5 line 24);
- (b) removing from each of the estimated phases an angle rotation introduced by a modulation format, wherein the rotation is determined based on a reference symbol (Fig.1 element 30 and Fig.2 element 214, column 3 lines 18-25, column 4 lines 25-37, and column 6 line 44 – column 7 line 25);
- (c) deriving a set of values from the estimated phases after removal of said angle rotation (Fig.1 element 36, Fig.2 element 226, Fig.4 element 68, Fig.5 element 274, column 3 lines 26-32 and column 7 line 40 – 57, and column 8 line 10 – column 9 line 25), wherein said values are a function of the carrier frequency and phase offsets to be estimated (column 3 lines 26-32 and column 7 line 58 – column 9 line 25); and
- (d) processing said values to determine estimates of the carrier frequency and phase offsets (Fig.1 elements 36 and 40, Fig.2 elements 222 and 224, Fig.4 element 66 and 70, Fig.5 elements 272 and 276, and column 7 line 58 – column 9 line 25).
- With regard claim 3, Avidor et al. further discloses step (c) uses an unwrap phase function to derive said set of values (Fig.1 element 36, Fig.2 element 226, Fig.4 element 68, Fig.5 element 274, and column 8 line 10 – column 9 line 25).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) in view of Yoshida et al. (US 5,170,415).

- With regard claim 2, Avidor et al. discloses all of the subject matter as described above except for specifically teaching initializing the parameters of a Phase-locked Loop with the estimated carrier frequency and the phase offset.

However, Yoshida et al. teaches initializing the parameters of a Phase-locked Loop with the estimated carrier frequency and the phase offset (Fig.8 elements 11, 12i, 13, 50, and 52, Fig.9 elements 64 and 65, column 7 lines 41-67, and column 8 lines 4-56).

It is desirable to initialize the parameters of a Phase-locked Loop with the estimated carrier frequency and the phase offset in order to improve the transmission efficiency and reduce the cost of the hardware implementations (column 1 lines 29-39). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Yoshida et al. in which initializing

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the parameters of a Phase-locked Loop with the estimated carrier frequency and the phase offset, into Avidor's estimating carrier frequency and phase offsets method so as to improve the transmission efficiency and reduce the cost of the hardware implementations.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) in view of Dobrica (US 5,875,215).

- In regard claim 4, Avidor et al. discloses all of the subject matter as described in the above paragraph except specifically teaching that the processing of step (d) uses an estimation algorithm based on the recursive least-squares method.

However, Dobrica teaches that uses an estimation algorithm based on the recursive least-squares method (Fig.2 element 7 and Fig.3 and 4, column 1 line 40 – column 2 line 3, column 5 line 51 – column 6 line 10, and column 7 line 63 – column 10 line 1).

It is desirable to use an estimation algorithm based on the recursive least-squares method in order to reduce the multiplicative distortion, improve the reliability of the estimation, and compensate for an influence of a tracking delay in RLS estimation (column 1 lines 39-50). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Dobrica in which use an estimation algorithm based on the recursive least-squares method, into Avidor's estimation algorithm so as to reduce the

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multiplicative distortion, improve the reliability of the estimation, and compensate for an influence of a tracking delay in RLS estimation.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) in view of Li et al. (US 6,031,880).

- In regard claim 5, Avidor et al. discloses all of the subject matter as described in the above paragraph except specifically teaching that the processing of step (d) uses an estimation algorithm based on the Kalman filter method.

However, Li et al. teaches that uses an estimation algorithm based on the Kalman filter method (Fig.4 element 70, column 1 line 39 – column 2 line 8, and column 5 line 42 – column 7 line 41, and column 9 line 20 – column 10 line 34).

It is desirable to use an estimation algorithm based on the Kalman filter method in order to reduce the computation of gain for each symbol (column 9 lines 7-20). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Li et al. in which use an estimation algorithm based on the Kalman filter method, into Avidor's estimation algorithm so as to reduce the computation of gain for each symbol.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) in view of Denno et al. (US 5,287,067).

- In regard claim 6, Avidor et al. discloses all of the subject matter as described in the above paragraph except specifically teaching that the

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processing of step (d) uses an estimation algorithm based on the least-mean squares method.

However, Denno et al. teaches that uses an estimation algorithm based on the least-mean squares method (Fig.13 and column 10 line 65 – column 11 line 50).

It is desirable to use an estimation algorithm based on the least-mean squares method in order to improve the quality at high speed and reduce the complicated circuit configuration (column 3 lines 5-12). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Denno et al. in which use an estimation algorithm based on the least-mean squares method, into Avidor's estimation algorithm so as to improve the quality at high speed and reduce the complicated circuit configuration.

8. Claims 7, 8, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) in view of Baum et al. (US 5,233,632).

- In regard claim 7, which is a method claim related to claim 1, Avidor et al. discloses all of the subject matter as described in the above paragraph except specifically teaching estimating the carrier phase and frequency offsets by curve fitting. All other limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.

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However, Baum et al. teaches estimating the carrier phase and frequency offsets by curve fitting (Fig.2 element 213, Fig.3B element 315, column 10 line 30-53, and column 3 lines 54-68).

It is desirable to estimate the carrier phase and frequency offsets by curve fitting in order to reduce the noise (column 3 line 65 – column 4 line 9).

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Baum et al. in which estimating the carrier phase and frequency offsets by curve fitting, into Avidor's estimation algorithm so as to improve the noise.

- With regard claim 8, which is a method claim related to claims 3 and 7, all limitation is contained in claims 3 and 7. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 14, which is an apparatus claim related to claim 7, Avidor et al. further discloses the limitation of an unwrap module for converting the phase estimates generated by the phase calculator module into absolute values (Fig.1 element 36, Fig.2 element 226, and column 8 line 10 – column 9 line 25). All other limitation is contained in claim 7. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 16, all limitation is contained in claim 14. The explanation of all the limitation is already addressed in the above paragraph.

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9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) and Baum et al. (US 5,233,632) as applied to claim 7 above, and further in view of Dobrica (US 5,875,215).

- With regard claim 9, which is a method claim related to claims 4 and 7, all limitation is contained in claims 4 and 7. The explanation of all the limitation is already addressed in the above paragraph.

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) and Baum et al. (US 5,233,632) as applied to claim 7 above, and further in view of Li et al. (US 6,031,880).

- With regard claim 10, which is a method claim related to claims 5 and 7, all limitation is contained in claims 5 and 7. The explanation of all the limitation is already addressed in the above paragraph.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) and Baum et al. (US 5,233,632) as applied to claim 7 above, and further in view of Denno et al. (US 5,287,067).

- With regard claim 11, which is a method claim related to claims 6 and 7, all limitation is contained in claims 6 and 7. The explanation of all the limitation is already addressed in the above paragraph.

12. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al. (US 6,421,399) and Baum et al. (US 5,233,632) as applied to claim 7 above, and further in view of Yoshida et al. (US 5,170,415).

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- With regard claim 12, which is a method claim related to claims 2 and 7, all limitation is contained in claims 2 and 7. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 15, which is an apparatus claim related to claim 12, all limitation is contained in claim 12. The explanation of all the limitation is already addressed in the above paragraph.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M Wang whose telephone number is (571) 272-3053. The examiner can normally be reached on 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Ted M Wang
Examiner
Art Unit 2634

Ted M. Wang



SHUWANG LIU
PRIMARY EXAMINER